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Attentional studies in hyperactivity

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Document Version
Publisher's PDF, also known as Version of record

Publication date:
1981

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):
Sergeant, J. A. (1981). *Attentional studies in hyperactivity*. Veenstra Visser Groningen.

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Download date: 05-05-2023

SUMMARY

This thesis tested the hypothesis that hyperactive rated children would exhibit a selective attention deficit. Inadequacies in the behavioural definition and assessment of both hyperactivity and selective attention, led to the conclusion in 1975, that contrary to general opinion, the selective attention hypothesis had not been adequately tested. Thus it was felt necessary to establish in what ways children rated to be overactive, distractable and impulsive show deficits of selective attention.

From samples acquired in normal schools, those children rated both by teachers and observers to be hyperactive were selected for study of selective attention processing. Selective attention was defined, following one current prominent theory (Shiffrin and Schneider, 1977) as a limitation in the capacity to encode, search and decide in "working memory" and operationalized in memory and visual search tasks in the paradigm suggested by Sternberg (1969 a,b). This enabled the term selective attention to be assessed in terms of stages of information processing rather than as a global contruct.

A systematic examination of three stages proposed in Sternberg's paradigm: encoding, search and binary decision and manipulation of the speed-accuracy trade-off by instruction sets provided evidence of differences between the hyperactive and normoactive rated children. These experiments did not, however, provide evidence of a selective attention deficit in hyperactives. These results lay open to question the hypothesis of selective attention deficits in hyperactive rated children in normal schools. It questions, furthermore, the usefulness of applying this concept diagnostically as proposed in the Diagnostic and Statistical Manual III and as an explanatory concept of hyperactive behaviour as recently suggested by Rosenthal and Allen (1978).

In chapter 1, the term hyperactivity is examined for its

aetiological, diagnostic and prognostic significance. It is concluded in this chapter that the aetiology is theoretically uncertain and that clear-cut diagnostic criteria are absent which lead to a diverse prognosis from psychotic to normal behaviour. To overcome some of these problems, the assessment of hyperactivity in this thesis will be conducted through behavioural ratings and observations by teachers and observers. Previous work in testing attentional deficits in hyperactivity are briefly reviewed. A critical summary of an attentional experiment by Sykes, Douglas and Morgenstern (1973) is given to illustrate the need to operationalize selective attention in terms of stages of information processing.

In chapter 2, there is reviewed the concept of selective attention as a cognitive process which is required to overcome the limitations in man's capacity to handle information, in certain conditions. These conditions refer to the modes of information processing: automatic and controlled processing (Shiffrin and Schneider, 1977). In an automatic mode, selective attention demands are absent. In controlled processing mode, demands of attention may lead to either a *divided attention deficit* or to a *focal attention deficit*. This thesis is concerned with the former, which is defined as a reduction in performance due to effects of loading the system by the addition of sensory inputs or additions in memory load. In this theory, selective attention has its locus in short term memory, consequently, tasks with a high loading on short term memory processes are required to establish the operation of divided attention. For this purpose search tasks are employed. Two types of search tasks were employed in this thesis: memory and visual search tasks.

In chapter 3, there was described in detail the selection procedure employed in obtaining subjects and the method of measurement used in the memory and visual search tasks.

This concludes section one of the thesis. This is followed by section two, which is a full-report of six experiments conducted to test the selective attention deficit hypothesis.

In experiment 1, the relation between ratings by teachers, observers and scoring of video-recordings of the children's behaviour is reported. Teachers rated the children on six scales: activity,

distractability, impulsivity, task application, irritability and talkativeness. Observers rated the children on the first three scales. There was further employed and tested for its validity as a diagnostic instrument, the Matching Familiar Figures test. The results of this experiment reject the employment of this test as a suitable instrument for rating hyperactivity. Succeeding studies will be based upon the concordant assessment of the children's behaviour by teacher and classroom observers on criteria scales given separately for each of the succeeding experiments.

In experiment 2, the first test of the selective attention hypothesis was conducted on three groups of children rated concordantly on three criteria scales: activity, distractability and impulsivity. Three groups of children were formed which represented firstly low scores on these scales, the so-called normoactives, secondly moderate scores, the somewhat hyperactives, and thirdly high scores on the criteria scales, the hyperactives. The task administered to the children was a memory search task. While there was evidence that the three groups differed from each other in their performance, there was no evidence of a selective attention deficit in the hyperactives. Indeed the somewhat hyperactive group differed most in performance from controls. Since this group was rated higher in task application than the hyperactives, the following experiment was designed to examine how task application related to attentional performance.

Four groups of children rated high or low on activity and high or low on task application took part in a memory search task in experiment 3. No evidence of a selective attention deficit was obtained in this study.

By employing the same groups in a visual search task, there was tested the possibility that the demands of a visual search task with simultaneous stimuli being presented for search and decision might lead to evidence of selective attention deficiency. While the accuracy of the children rated to be overactive was significantly different from normoactives, children rated as variable were less accurate than children rated to be consistent in task application. These results of experiment 4 did not implicate selective attention as being disturbed in hyperactives.

In experiment 5, the same visual search task was employed but in two conditions of stimulus visibility: intact and degraded and with three groups of children rated firstly to be overactive and distractable, secondly distractable and thirdly low on distractability and activity. While there was clear operation of selective attention and of the encoding stage of the model, there could not be shown to be any evidence of either an encoding or a selective attention deficit in the hyperactive children. Inspection of the group who differed most from controls suggested that the performance of this group could perhaps be accounted for by a strategy where accuracy is sacraficed for the speed of cognitive processing.

In experiment 6, there was made a formal test of the relation between speed and accuracy in a visual search task with the same groups of children which were used in experiment 5. It was found that there were clear differences between hyperactives, somewhat hyperactive and controls. However, these differences were not to be explained by a selective attention hypothesis. They were to be accounted for by a difference in the effect of a speed stress upon, on the one hand, hyperactives and, on the other hand, the somewhat hyperactives and controls. The latter two groups obeyed the expectations of the macro-trade-off function. The latter group did not conform to this function. This group's performance could be accounted for by a deadline model of information processing, whereas the somewhat hyperactives and controls conformed to a fast guess model. Inspection of the latency of error responses in relation to correct responses suggested that hyperactives may alternate between applying a *fast guess* or a *deadline* strategy in meeting the demands of the task.

In the general discussion a number of critical issues in research in hyperactivity is discussed: selection of samples, cognitive models and clinical samples, time-on-task effects in hyperactivity, strategy differences in hyperactivity. This is followed by considering the special effect of speed-stress on information processing. Recent suggestions which relate the effects of speed of processing to the state of the organism are considered and suggestions are made how such proposals may account for the results found in this set of experiments. There is indicated the need to consider in

future work the role of state factors in information processing and this is related to the response organization stage of the model.

It is concluded that there is no evidence to support the selective attention deficit hypothesis in children rated to be hyperactive who attend a normal school as measured in memory and visual search tasks used here.